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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/584,267

Filing Date: June 23, 2006

Appellant(s): OKUYAMA ET AL.

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Manabu Kanesaka  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 05/31/2011 appealing from the Office action mailed 01/04/2011.

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**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The following is a list of claims that are rejected and pending in the application:

Claims 1-10, 12-14, 16, 21-23, 27-28, 32-33, 39-40, 43, 47, 52, 55, and 58-77 are pending in the application, and claims 13-14 and 58-77 stand rejected.

**(4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of

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rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS."

New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

## (7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

**(8) Evidence Relied Upon**

6,811,905 Cropley et al 11-2004  
4,840,783 Quang et al 06-1989

#### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:  
Claims 13-14, 58-66, and 68-76 are rejected under 35 U.S.C. 102(e) as  
being anticipated by Cropley et al (US 6811905).

Regarding **claims 13-14**, Cropley et al teaches a methanol fuel cell that can be used in an alternative method to produce hydrogen. The fuel cell comprises a partition membrane with electrodes on opposing sides, wherein a methanol and water fuel mixture is introduced to one electrode and oxygen is introduced to the opposing electrode. Cropley also teaches a means for supplying an oxidizing agent and fuel containing an organic compound to opposite electrodes. Cropley teaches that there is a means for collecting (discharging) methanol, water, and carbon dioxide (see column 7, lines 25-35). This means is located at the anode (fuel electrode) side of the fuel cell and thus

would be capable of collecting hydrogen if it was generated on this electrode.

Therefore, it is a functionally equivalent means to that of the instant claim.

The hydrogen generating system taught by Cropley et al meets all of the structural limitations of instant claims 13-14, and therefore anticipates the claims. The designation of the amended claim that one of the configurations in which the system can operate is an open circuit configuration wherein no current is supplied to either electrode is an intended use limitation. Whether current or not current is supplied to either electrode is a function of the process in which the claimed system is being used; it is not, therefore, a structural limitation that can be used to define a product claim. The system taught by Cropley could indeed have all of the needed connections for supplying current to the electrodes, but would still meet all of the patentably weighted limitations of the instant claims because the state of use of the instantly claimed system cannot be used in distinguishing the claims. For instance, the Cropley system (that meets all of the product limitations of the instant claims) would also meet the requirement that no current is supplied to either electrode when the system is off and not in use.

Similarly, the voltage between the electrodes in a generating system is a function of the use of said system and does not relate to the structure of the system. As such, the method of use limitations regarding the voltage between the electrodes do not hold patentable weight in the product claims, and as stated above, claims 13-14 are anticipated by Cropley.

Regarding **claims 58-61 and 68-71**, the limitations regarding varying of certain parameters during the use of the hydrogen generating system are

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process limitations. They therefore do not hold patentable weight in the product claims 58-61 and 68-71. As such, the claims do not further limit claims 13-14 and so they are anticipated by Cropley, which teaches a structurally equivalent system.

Regarding **claims 62 and 72**, the limitations regarding the operation temperature of the system are process limitations. They therefore do not hold patentable weight in the product claims 62 and 72. As such, the claims do not further limit claims 13-14, and so they are anticipated by Cropley, which teaches a structurally equivalent system.

Regarding **claims 63 and 73**, Cropley teaches that the membrane is a proton conducting solid electrolyte membrane (see claim 1), and preferably, a perfluorosulfonic acid membrane (see column 10, lines 40-43).

Regarding **claims 64 and 74**, Cropley teaches that the anode (fuel electrode) comprises a platinum-ruthenium film (see column 4, lines 20-23). The film can be dispersed a support such as carbon (see column 8, lines 57-62).

Regarding **claims 65 and 75**, Cropley teaches that the cathode (oxidizing electrode) comprises a platinum film that can be supported on carbon powder (see column 4, lines 24-25 and column 8, lines 57-62).

Regarding **claims 66 and 76**, Cropley teaches that liquid fuel (a mixture of organic compound and water) is circulated for cooling of the cell, indicating a means for circulating fuel (see column 11, lines 41-42).

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Claims 67 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cropley et al (US 6811905) in view of Quang et al (US 4840783).

Regarding **claims 67 and 77**, the claim differs from Cropley et al because Cropley does not teach a carbon dioxide absorbing portion for removing carbon dioxide from the produced hydrogen gas. However, it would have been obvious to modify Cropley in view of Quang et al in order to add such an absorbing portion to the system because Quang teaches a method of producing hydrogen from methanol involving an advantageous carbon dioxide absorbing portion (see claim 18). One of ordinary skill would have been motivated to include such an absorbing portion because doing so would result in a product gas produced by the Cropley system having a higher hydrogen purity. One would have expected reasonable success in the modification because Cropley teaches that hydrogen can be produced from the inventive system and Quang teaches a method for removing carbon dioxide from such produced hydrogen-containing gas. Therefore, claims 67 and 77 are obvious and not patentably distinct over the prior art of record.

#### **(10) Response to Argument**

Applicant argues that the rejections of the instant claims over Cropley et al should not be sustained, contending that the claims 13 and 14 are directed to the generation of hydrogen gas in the absence of a current being supplied to the electrodes of the claimed device. It is important to understand that this is not the case, as it is indicative of differences in opinion between applicant and the

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Examiner on the patentability of the claimed product. In fact, it is *not* the case that the instant claims are directed to "the generation of hydrogen gas", as this would imply that the claims are to the generation method. Instead, the claims are drawn to an apparatus that can be used under certain conditions to produce hydrogen case according to the conditions argues herein. However, as is discussed in greater detail below, the reactions that *can* occur using the claimed apparatus have no bearing in distinguishing the actual claimed subject matter (that is, the apparatus) over the that of the prior art that is equivalent.

Applicant's arguments spanning essentially pages 8-10 of the appeal brief are thus pertaining to the reactions that occur according to the method of the instant specification. As in previous actions, applicant contends that because the instantly claimed system is used with different reactions it is distinct from the Cropley system. However, as also previously discussed, these differences in the reactions and the gasses generated at the respective electrodes are drawn to process limitations, and thus do nothing to show that the two systems (apparatuses) are in any way different. Indeed, applicant argues that it "can be said" that a means for collecting differs if that materials to be collected differ, but then proceeds to offer no reasons why this is true. Simply contending that a means for collecting one gas is different than a means for collecting another is not proof or evidence of distinction. Therefore, it remains clear that the collection means of Cropley is equivalent to that of the instant claims, is capable of collecting hydrogen, and reads on this limitation in the instant claims. The same holds true for the corresponding collection means on the cathode side.

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Essentially, applicant contends that the fuel cell apparatus of Cropley is not equivalent to that of the instant claims because it is used to carry out different reactions. The argument, however, has been made that the components of Cropley could be used to carry out the reactions called for in the instant claims. Applicant has offered no arguments or evidence that this is not the case, or that the corresponding components are not equivalent.

Applicant further contends that the claimed means for withdrawing electric energy for the fuel cell have not been addressed in the rejections, and argues that Cropley fails to disclose means meeting the claim limitations. This argument is not convincing. First, applicant's parenthetical insertion of "potentiostat" into the argument regarding collection means seems to imply that such a term is part of the instant claim limitations, but it is not. The claims as actually written only call for "means for withdrawing electric energy", and the teachings of Cropley meet these limitations. As Cropley teaches a fuel cell comprising electrodes, it clearly teaches that said electrodes are configured to be part of a circuit, with electricity flowing from said electrodes to said circuit. This configuration meets the claim limitations as they are actually written. The instant limitations to which electrode serves as the anode and which as the cathode are, again, functions of the manner in which the apparatus is used. As applicant has made clear in the instant and previous arguments, each electrode in the fuel cell apparatus can function as *both* the cathode and the anode depending on the fuel application parameters and voltage between. This shows, then that the distinction of which electrode is the anode or cathode imposes no *product* limitations on the claimed

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product, as they are structurally the same either way. Thus, the Cropley fuel cell, necessarily as it is connected to means for circulating and collecting current, does, in fact, contain a "means for withdrawing electric energy". Applicant's arguments in this regard are therefore also unpersuasive.

Regarding the rejections of claims 67 and 77, applicant contends that the modification of Cropley in view of Quang is not valid because the teachings of Quang, when taken as whole, are to a hydrogen production process wherein carbon dioxide is removed from a mixture and not from pure hydrogen. Applicant also erroneously contends that the Quang claim 18 is the sole section relied upon, presumably because this was the only specific citation made in the rejection. This latter contention is false, as the entirety of Quang was considered and applicant in the rejection, as is evident from the citation of Quang as a whole as the beginning section of the rejection. Applicant's former line of argument is also not persuasive, as it is based on the assumption that Cropley produces pure hydrogen from its inventive fuel cell, to such a degree that one of ordinary skill would not see any need to further purify it before use. This is not the case; as those of ordinary skill in the art would be well aware, the carbon dioxide is a byproduct of hydrogen production, and is mixed inevitable with the hydrogen produced therefrom. Therefore, one would have ample motivation to remove said carbon dioxide, having known about its presence and not operating under the assumption, as applicant is here, that the produced hydrogen is completely pure. Thus, applicant's arguments regarding the combination of references is based on a false assumption: that one of ordinary skill would only have thought to use the

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carbon dioxide absorbing portion of Quang if Cropley specifically taught the deliberate addition of CO<sub>2</sub>. Because, as shown above, this is not how skilled artisans would understand the process, applicant's arguments regarding the rejections of claims 67 and 77 are not persuasive.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

**Conclusion**

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Noah S Wiese/

Examiner, Art Unit 1731

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